requested. Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attachment is captioned "Version With Markings To Show Changes Made."

Rejection In View Of Priegnitz

Claims 15-23 have been rejected under section 103 as being unpatentable over U.S. Patent No. 6,162,267 to Priegnitz et al. U.S. Patent No. 6,162,267 was filed on Dec. 11, 1998.

The Attached to this Amendment is a 131 Declaration (actually there are two identical 131 Declarations, one is signed by Dr. Yong Wang and the other signed by Drs. Tonkovich and VanderWiel). As established by the facts set forth in the attached 131 Declaration, applicants possessed the claimed invention on or before the effective date of the cited reference (Priegnitz). Alternatively, the attached 131 Declaration shows as much of the claimed invention as is shown in the cited reference (Priegnitz) and therefore the Priegnitz reference is eliminated as prior art. See MPEP 715.02 citing *In re Stryker* 168 USPQ 372 (CCPA 1971) and *In re Wakefield*, 164 USPQ 636 (CCPA 1970). More specifically, the evidence in the 131 Declaration shows reduction to practice of: a steam reforming catalyst structure comprising a spinel support and a steam reforming catalyst (Rh or Ni). The catalyst structure was subsequently tested and found to possess the properties recited in claim 15 and described in the Example.

Thus, the 131 Declaration establishes that applicants possessed the claimed invention on or before Dec. 11, 1998 (or, alternatively, on or before Dec. 11, 1998, applicants possessed at least as much of the claimed invention as the Priegnitz reference). Accordingly, the Priegnitz reference has

been eliminated as prior art, and, withdrawal of the rejection in view of Priegnitz is respectfully requested.

Additionally, Priegnitz does not teach or suggest some of the claimed features (nor are they inherent). For example, Priegnitz does not teach or suggest a catalyst structure having a magnesia passivation layer as recited in claim 20, nor a catalyst made by impregnating with magnesia as recited in claim 19 (such as by impregnating an alumina support with a solution of magnesium nitrate). Thus, the claimed invention is additionally patentable based on this ground.

Conclusion

If the Examiner has any questions or would like to speak to Applicants' representative, the Examiner is encouraged to call Applicants' attorney at the number provided below.

Respectfully submitted,

Date: 11 Feb. 2003

By: Frank S. Rosenberg

send correspondence to:
Frank S. Rosenberg
18 Echo Hill Lane
Moraga, CA 94556
fax. no. (925) 376-8429

Frank S. Rosenberg
Registration No. 37,068
tel: (925) 376-8416

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

The paragraph beginning at page 1, line 9, after "RELATED APPLICATIONS", has been replaced with:

-- This is a divisional of U.S. Patent Application Ser. No. 09/375,615, now U.S. Patent No. [_____,] 6,284,217, filed August 17, 1999. --

IN THE CLAIMS

Claim 15 has been amended as follows:

15. (Amended) A steam reforming catalyst structure comprising:

a support comprising a spinel support; and

a steam reforming catalyst selected from the group consisting of rhodium, iridium, nickel, palladium, platinum, carbide of group [IVb] VIb and combinations thereof;

wherein the catalyst structure has stability such that, when tested in a packed bed at 900°C, with a feedstream consisting essentially of methane and steam at a 1:1 ratio of methane to steam, at a constant pressure and a contact time such that there is a hydrocarbon conversion of at least 50%, and measuring the CO selectivity, wherein between 26 hours time-on-stream and about 40 hours time-on-stream, the CO selectivity remains essentially unchanged and the hydrocarbon absolute conversion changes less than about 5%.

#8

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
Wang et al.	:	
Application No. 09/930,040	:	Art Unit: 1764
Filed: Aug. 14, 2001	:	Examiner: B. Yildirim
For: METHOD AND CATALYST STRUCTURE FOR STEAM REFORMING OF A HYDROCARBON	:	Atty Docket: B-1482-DIV

DECLARATION PURSUANT TO 37 CFR § 1.131

1. The attached document in which the first line reads "POx/SR" is a copy of a lab notebook page that was written on or before 11 December 1998. The entry "Yong: Ni or Rh (oxide) on MgO/Al_2O_3 (spinel)" is a note from a meeting showing that, on or before 11 December 1998, Yong Wang suggested preparing a steam reforming catalyst comprising Ni or Rh (oxide) on a MgO/Al_2O_3 spinel support.

2. The attached document in which the first line begins "Precoat of" is a copy of a lab notebook page that was written on or before 11 December 1998. This page shows that, on or before 11

December 1998, a MgO/Al_2O_3 spinel support was made by impregnating alumina with a magnesium nitrate solution.

3. The attached document in which the first line begins "Rhodium onto" is a copy of a lab notebook page that was written on or before 11 December 1998. This page shows that, on or before 11 December 1998, we prepared a rhodium oxide on MgO/Al_2O_3 spinel catalyst structure. The support referred to on this page is the MgO/Al_2O_3 spinel support described in paragraph 2 above.

4. Subsequent testing of the catalyst described in paragraph 3 demonstrated the time-on-stream performance shown in Fig. 2 of the patent application.

5. The attached document in which the first line begins "NiO of" is a copy of a lab notebook page that was written on or before 11 December 1998. This page shows that, on or before 11 December 1998, we prepared a nickel oxide on MgO/Al_2O_3 spinel catalyst structure. The support referred to on this page is the MgO/Al_2O_3 spinel support described in paragraph 2 above.

6. All of the attached documents have been copied without change except that dates have been blanked out.

7. I declare that all of the above statements made of my own knowledge are true and all statements made on information and belief are believed to be true. I understand that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. §1001), and may jeopardize the validity of the application or any patent issuing thereon.

Date: 2/15/2003 By: _____
Yong Wang

Date: _____ By: _____
David P. VanderWiel

Date: _____ By: _____
Anna Lee Y. Tonkovich

• POx/SR (...CONT'D)

- .. O_2 CONV. ~100% → LIMITS CH_4 CONV.
- .. SIGNIFICANT H_2O FORMATION (H_2 SELECTIVITY ??)
- → NEXT STEP: ALKALI PROMOTION
- → LEE: POx MAYBE 'OFF THE TABLE' SOON → FOCUS ON SR ∧ (compressor costs)
- .. CAN ADD MORE O_2 TO INCR. SEECTIVITY, BUT CONV. WILL DECR
  - → CO_2 FAVORED AT HIGHER $\frac{O_2}{CH_4}$
- → YONG: Ni OR Rh (oxide) ON MgO/Al_2O_3 (spinel)

- SR: (mid-low Rh loadings done) Rh/α-Al_2O_3 — $\frac{3}{1} = \frac{H_2O}{CH_4}$ @ 25 ms
  - .. ~~lower~~ higher loading performs better (2.8% Rh)
  - .. both have very low conv. < 25% — Select. < 70%
  - .. γ-Al_2O_3 RESULTS FROM EARLIER: PERF. MUCH BETTER (~100% Conv.) (Select.
    - ← @ 15 msec. to 25 msec. → 7% Rh. (...

• WAYNE - CAT. PREP.

- 5% Co, Fe, Ru / γ-Al_2O_3 FOR MDS READY TOMORROW
- NEED SUPPORTS - YONG: Strem, Aldrich ? — ~~[illegible]~~
  ~~[illegible]~~
- ERIC: FOAMS FOR YUFEI ARE READY - CERAMIC ADHESION TECHNIQUES

→ SINGLE POx/SR REACTORS: ADAPT. TO USE SAME ½" ANNULAR TU...
- check sizing / flow options

○ CAT. SELECTION

CH_4 ⟶ SYNGAS ⟶ MeOH
(PCC: SR? POx?) ⟶ FTS

- SR
  - .. literature: precious metals - Rh best
    - supports - all — Al_2O_3 & ZrO_2 & MgO best
    - promoters - alkali oxides
- MeOH
  - .. thermo: low T, high P
  - .. system: low P, high cat. activity (even lower T)
  - .. commercial: Cu-Zn/Al_2O_3 (ICI - Catalco) } 50 ATM
    - @ 120 msec.: 2.5 g MeOH/g·cat.·hr (~100% selectivity)
  - .. literature: Rh, Pd — ~~se~~ selective but not as activity

Project No.________________ Date of Work________________

Entered By DVW Date________________

Disclosed To and Understood By

Signed 1. [signature] Date____

[signature] Date

Precoat of ~~Strem α-Al_2O_3~~ 93-6 γ-Al_2O_3 with MgO at 6 % wt 7
from July 24, 1997 Paper by Choudhary, Uphade, Mamman
from paper: Mg % reported as % MgO.

,99-007

Crucible wt.	w/ γ-Al_2O_3	γ-Al_2O_3 wt	Out of Oven @ 900°C
49.1663	51.1702 g	2.0039 g	51.2980

MgO Δ = 0.1278 g

Must not contain O_2 from Aluminum

(.94) total wt = 2.0039 g
total wt = 2.1318 g
want 0.1279 g of MgO using $Mg(NO_3)_2 \cdot 6H_2O$

$$\frac{MgO}{Mg(NO_3)_2 \cdot 6H_2O} = \frac{40.3}{256.4} = \frac{0.1279\ g}{Mg\ Nitrate} \Rightarrow 0.8137\ g$$

For incip. wetness: $2.00\ g \times 2.3\ \frac{ml}{g} \approx 4.6$ ml sol'n

→ Used 0.8158 g Mg Nitrate and 4.63 ml water added
(easily went into solution)

Into oven and used same temp program to: Seg 5 Ramp to 900° at 3.0°/min; Seg 6 Dwell 120 min

6.0 % MgO Loading
1.88 g of −70 +100 mesh precoated support
(≈ 0.25 g < 100 mesh)

Check for incipient wetness with water using −100 me
~0.52 g for .236 g of support ≈ (2.20 ml/g

Project No. _____ Date of Work _____
Entered By J. Vitale Date _____
Disclosed To and Understood By _____

Rhodium onto MgO Precoated γ-Al_2O_3 (for Methane to Syn Gas)

13% as RhO_2

13699-011

Precoated Support from pg 7

Dish Wt.	cat. Support	
37.0331g	37.6992g	⇒ 0.6661 g of 6% MgO precoated Support

(187) total wt = 0.6661 g
total wt = 0.7656 g ⇒ 0.0995 g RhO_2

$$\frac{RhO_2}{134.9} = \frac{Rh}{RhO_2} = \frac{x}{.0995g} = \frac{102.9}{134.9} \Rightarrow .0759\,g\,Rh_{needed}$$

Using Engelhard's 10.37 % Rh solution:

10.37% soln = .0759 g Rh

soln = .7321g

0.7376 g soln + Water = 1.3755

Calcined at 500° for 180 min (pg 9 program)

Out of oven: 37.8060 ⇒ 0.1068 g RhO_2 with 0.7729 g Total

0.1068 g / .7729 g RhO_2 Catalyst = 13.82 % RhO_2

Project No. _____ Date of Work _____

Entered By A. Wilcox Date _____

Disclosed To and Understood By

Signed 1. D. Cuthbertson Date _____

2. _____ Date _____

8

13699-008

NiO on 13% onto MgO Precoated γ-Al_2O_3 (Methane to Syn Gas)

Using support made on previous page:

Dish wt	Dish & cat. support	
37.7403	38.3980	0.6577 g of precoated support

(87.0%) total wt = 0.6577 g
total wt = 0.7560 g ⇒ 0.0983 g NiO wanted

$\frac{NiO}{Ni(NO_3)_2 \cdot 6H_2O} = \frac{74.71}{290.81} = \frac{0.0983}{Ni(NO_3)_2 \cdot 6H_2O}$ ⇒ 0.3826 g $Ni(NO_3) \cdot 6H_2O$ needed

$2.20 \frac{ml}{g} \times .6577 g = 1.45 ml$

Used ⇒ 0.3862 g in 1.44 ml H_2O

Thurs. Out of oven, 500°: 38.4889 g ⇒ .0909 g NiO

$\frac{.0909 NiO}{0.7486 g \text{ total}}$ = 12.14% NiO

— Paper lists %'s as oxides

Project No. _____ Date of Work ____/____/____

Entered By W. Wilcox Date ____/____/____

Disclosed To and Understood By

Signed 1. _____ Date ____/____/____

2. _____ Date ____/____/____

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
Wang et al.	:	
Application No. 09/930,040	:	Art Unit: 1764
Filed: Aug. 14, 2001	:	Examiner: B. Yildirim
For: METHOD AND CATALYST STRUCTURE FOR STEAM REFORMING OF A HYDROCARBON	:	Atty Docket: B-1482-DIV

DECLARATION PURSUANT TO 37 CFR § 1.131

1. The attached document in which the first line reads "POx/SR" is a copy of a lab notebook page that was written on or before 11 December 1998. The entry "Yong: Ni or Rh (oxide) on MgO/Al_2O_3 (spinel)" is a note from a meeting showing that, on or before 11 December 1998, Yong Wang suggested preparing a steam reforming catalyst comprising Ni or Rh (oxide) on a MgO/Al_2O_3 spinel support.

2. The attached document in which the first line begins "Precoat of" is a copy of a lab notebook page that was written on or before 11 December 1998. This page shows that, on or before 11

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3. The attached document in which the first line begins "Rhodium onto" is a copy of a lab notebook page that was written on or before 11 December 1998. This page shows that, on or before 11 December 1998, we prepared a rhodium oxide on MgO/Al_2O_3 spinel catalyst structure. The support referred to on this page is the MgO/Al_2O_3 spinel support described in paragraph 2 above.

4. Subsequent testing of the catalyst described in paragraph 3 demonstrated the time-on-stream performance shown in Fig. 2 of the patent application.

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6. All of the attached documents have been copied without change except that dates have been blanked out.

7. I declare that all of the above statements made of my own knowledge are true and all statements made on information and belief are believed to be true. I understand that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. §1001), and may jeopardize the validity of the application or any patent issuing thereon.

Date: _____ By: _____
Yong Wang

Date: Feb. 11, 2003 By: _____
David P. VanderWiel

Date: Feb 10, 2003 By: _____
Anna Lee Y. Tonkovich

- POx/SR (...CONT'D)
  - O_2 conv. ~100% → LIMITS CH_4 CONV.
  - SIGNIFICANT H_2O FORMATION (H_2 SELECTIVITY ??)
  - → NEXT STEP: ALKALI PROMOTION
  - → LEE: POX MAYBE OFF THE TABLE' SOON → FOCUS ON SR AT compressor costs
  - CAN ADD MORE O_2 TO INCR SELECTIVITY, BUT CONV. WILL DECR
    - → CO_2 FAVORED AT HIGHER $\frac{O_2}{CH_4}$
  - → YOUNG: Ni or Rh (oxide) on MgO/Al_2O_3 (spinel)
- SR: (mid-low Rh loadings done) $Rh/\alpha\text{-}Al_2O_3$ – $\frac{3}{1} = \frac{H_2O}{CH_4}$ @ 25 ms
  - higher loading performs better (2.8% Rh)
  - both have very low conv. < 25% – Select. < 80%
  - $\gamma\text{-}Al_2O_3$ RESULTS FROM EARLIER: PERF. MUCH BETTER (~100% Conv.) (Select. ↑ @ 15 msec, ~ 25 msec) — 7% Rh (H_2
- WAYNE - CAT. PREP.
  - 5% Co, Fe, Ru / $\gamma\text{-}Al_2O_3$ FOR MDS READY TOMORROW
  - NEED SUPPORTS – YOUNG: Strem, Aldrich ? --- [redacted]
  - ERIC: FOAMS FOR YOUNG ARE READY – CERAMIC ADHESIVES TECHNIQUES
  - → SINGLE POX/SR REACTIONS: ADAPT TO USE SAME ½" ANNULAR TUB
    - check sizing / flow options
- CAT. SELECTION

CH_4 → SYNGAS → MeOH / FTS
RC [SR ? POx ?

  - SR
    - literature: precious metals – Rh best
      supports – all – Al_2O_3 & ZrO_2 & MgO best
      promoters – alkali oxides
  - MeOH
    - thermo: low T, high P
    - system: low P, high cat. activity (even lower T)
    - commercial: $Cu\text{-}Zn/Al_2O_3$ (ICI – Catalco) } 50 atm
      – @ 120 msec: 2.5 g MeOH/g cat-hr (~100% selectivity)
    - literature: Rh, Pd – selective but not as active

Project No. _____ Date at Work _____
Entered By DVW Date _____
Disclosed To and Understood By
Signed 1: _____ Date _____

Precoat of 1393-b δ-Al_2O_3 ~~Strem α-Al_2O_3~~ with MgO at 6 % wt 7
from July 24, 1997 Paper by Chowdhary, Uphade, Akimoto
from paper: Mg % reported as % MgO

99-007

Crucible Wt.	w/ δ-Al_2O_3	δ-Al_2O_3 wt	Out of Oven @ 900°C
49.1663	51.1702 g	2.0039 g	51.2980

MgO ≈ 0.1278 g

Must not combine with any O_2 from Aluminum

(94) total wt = 2.0039 g
total wt = 2.1318 g
want 0.1279 g of MgO using $Mg(NO_3)_2 \cdot 6H_2O$

$$\frac{MgO}{Mg(NO_3)_2 \cdot 6H_2O} = \frac{40.3}{256.4} = \frac{0.1279\ g}{Mg\ Nitrate} \Rightarrow 0.8137\ g$$

For incip. wetness: $2.00\ g \times 2.3\ \frac{ml}{g} \Rightarrow 4.6$ ml soln

→ Used 0.8158 g Mg Nitrate and 4.63 ml water added (easily went into solution)

Into oven and used same temp program to: Seg 5 Ramp to 900° at 3.0°/min; Seg 6 Dwell 120 min

6.0 % MgO Loading

1.58 g of −70 +100 mesh precoated support (≈ 0.25 g < 100 mesh)

Check for incipient wetness with water using −100 mesh

~0.52 g/hr · .236 g of support ⇒ (2.20 ml/g

Project No. _____ Date of Work _____
Entered By _____ Date _____

13699-011

Rhodium onto MgO Precoated γ-Al_2O_3 (For Methane to Syn Gas) 11
15% as RhO_2

Precoated Support from pg 7

Dish wt.	wt. Support
37.0331g	37.6992g

⇒ 0.6661 g of 6% MgO precoated Support

(89%) total wt = 0.6661 g
total wt = 0.7656g ⇒ 0.0995 g RhO_2

$\frac{RhO_2}{134.9} = \frac{Rh}{RhO_2} = \frac{x}{.0995g} = \frac{102.9}{134.9}$ ⇒ .0759 g Rh needed

Using Engelhards 10.37% Rh solution:

10.37% soln = .0759 g Rh

soln = .7321g

0.7376 g soln + water = 1.3755

Calcined at 500° for 180 min (pg 7 program)

Out of oven: 37.8060 ⇒ 0.1068 g RhO_2 with 0.7729 g Total

0.1068g/.7729g RhO_2 Catalyst = 13.82% RhO_2

Project No: _____ Date of Work: _____
Entered By: _____ Date: _____
Disclosed To and Understood By
Signed 1: _____ Date: _____
2: _____

8

NiO of 13% onto MgO Precoated γ-Al_2O_3 (Methane to Syn Gas)

Using support made on previous page:

13699-008

Dish lbf	Dish & cat. support
37.7403	38.3980

0.6577 g of precoated support

(87.0%) total wt = 0.6577 g
total wt = 0.7560 g ⇒ 0.0983 g NiO wanted

$\frac{NiO}{Ni(NO_3)_2 \cdot nH_2O} = \frac{74.71}{290.81} = \frac{0.0983}{Ni(NO_3)_2 \cdot 6H_2O}$ ⇒ 0.3826 g $Ni(NO_3)_2 \cdot 6H_2O$ needed

2.20 $\frac{g}{g}$ × .6577 g = 1.45 ml

Used ⇒ 0.3862 g in 1.44 ml H_2O

Out of oven, 500°: 38.4889 g ⇒ .0909 g NiO

$\frac{.0909 \text{ NiO}}{0.7486 \text{ g total}}$ = 12.14% NiO

Paper lists 7's as oxides

Project No. _____ Date of Work _____
Entered By. W. Wilcox Date _____
Disclosed To and Understood By
Signed 1. _____ Date _____
2. _____ Date _____